Table 1. Selected acute and chronic ecological screening levels (Eco SLs) for chemicals in water [a]

CONTAMINANT OF INTEREST[b]	SELECTED ACUTE SL (µg/L)	SELECTED CHRONIC SL (µg/L)	ACUTE SOURCE OR SURROGATE[c]	CHRONIC SOURCE OR SURROGATE[c]	CITATIONS AND NOTES[d]
Dioxins					
Dioxin (2,3,7,8 TCDD)	0.01	0.0001	ODEQ	AWQC	EPA (1984)
Dibenzofuran	66	3.7	Tier II	Tier II	
Metals					
Aluminum	750	87	AWQC	AWQC	These criteria only apply to waters within a pH range of 6.5 – 9.0 as given in the national AWQC.
Antimony	180	30	Tier II	Tier II	
Arsenic	340	150	AWQC	AWQC	As(III)
Barium	110	4	Tier II	Tier II	
Beryllium	35	0.66	Tier II	Tier II	Per EPA comments use Tier II instead of ODEQ guidance values.
Butyltin ion	0.46	0.072	AWQC	AWQC	TBT value
Cadmium	0.52	0.09	AWQC	AWQC	Criteria are hardness-dependent. These values correspond to a hardness of 25 mg/L calcium carbonate (estimate for lower Willamette River) and were adjusted using EPA-provided equations. Criteria are for dissolved fraction.
Chromium (III)	183.1	23.8	AWQC	AWQC	Criteria are hardness-dependent. These values correspond to a hardness of 25 mg/L calcium carbonate (estimate for lower Willamette River) and were adjusted using EPA-provided equations. Criteria are for dissolved fraction.
Chromium (VI)	16	11	AWQC	AWQC	Criteria are hardness-dependent. These values correspond to a hardness of 25 mg/L calcium carbonate (estimate for lower Willamette River) and were adjusted using EPA-provided equations. Criteria are for dissolved fraction.
Cobalt	1500	5.1	Tier II	LCV	

Table 1. Selected acute and chronic ecological screening levels (Eco SLs) for chemicals in water [a]

CONTAMINANT OF INTEREST[b]	SELECTED ACUTE SL (µg/L)	SELECTED CHRONIC SL (µg/L)	ACUTE SOURCE OR SURROGATE[c]	CHRONIC SOURCE OR SURROGATE[c]	CITATIONS AND NOTES[d]
Copper	3.64	2.74	AWQC	AWQC	Criteria are hardness-dependent. These values correspond to a hardness of 25 mg/L calcium carbonate (estimate for lower Willamette River) and were adjusted using EPA-provided equations. Criteria are for dissolved fraction.
Cyanide	22	5.2	AWQC	AWQC	
Dibutyltin ion	0.46	0.072	AWQC	AWQC	TBT value
Iron	NA	1,000	NA	AWQC	Per EPA comments, exclude acute value.
Lead	13.88	0.54	AWQC	AWQC	Criteria are hardness-dependent. These values correspond to a hardness of 25 mg/L calcium carbonate (estimate for lower Willamette River) and were adjusted using EPA-provided equations. Criteria are for dissolved fraction.
Magnesium	820,000	82,000	LCV*10	LCV	
Manganese	2,300	120	Tier II	Tier II	
Mercury	1.4	0.77	AWQC	AWQC	
Methyl-mercury	0.099	0.0028	Tier II	Tier II	
Nickel	144.9	16.1	AWQC	AWQC	Criteria are hardness-dependent. These values correspond to a hardness of 25 mg/L calcium carbonate (estimate for lower Willamette River) and were adjusted using EPA-provided equations. Criteria are for dissolved fraction.
Potassium	530,000	53,000	LCV*10	LCV	
Selenium	12.8	5	AWQC	AWQC	The listed acute value is for selenate, and is the lower of the published criteria for selenate and selenite.
Silver	0.3	0.1	AWQC	ODEQ	AWQC are hardness-dependent. This value corresponds to a hardness of 25 mg/L calcium carbonate (estimate for lower Willamette River) and was adjusted using EPA-provided equations. Criteria are for dissolved fraction. ODEQ guidance value based on old AWQC (EPA 1980).
Sodium	6,800,000	680,000	LCV*10	LCV	
Thallium	1,400	40	ODEQ	ODEQ	
Tributyltin ion	0.46	0.072	AWQC	AWQC	Criteria apply to TBT ion concentration (EPA 2003a)

Table 1. Selected acute and chronic ecological screening levels (Eco SLs) for chemicals in water [a]

CONTAMINANT OF INTEREST[b]	SELECTED ACUTE SL (µg/L)	SELECTED CHRONIC SL (µg/L)	ACUTE SOURCE OR SURROGATE[c]	CHRONIC SOURCE OR SURROGATE[c]	CITATIONS AND NOTES[d]
Vanadium	280	20	Tier II	Tier II	
Zinc	36.2	36.5	AWQC	AWQC	Criteria are hardness-dependent. These values correspond to a hardness of 25 mg/L calcium carbonate (estimate for lower Willamette River) and were adjusted using EPA-provided equations. Criteria are for dissolved fraction.
PAHs					
2-Methylnaphthalene	37	2.1	Tier II	Tier II	The acute and chronic SLs are for the surrogate compound 1-methynapthalene.
Acenaphthene	80	23	Tier II	Tier II	The listed acute and chronic SLs are the EPA calculated FAV and FCV for sediment quality guideline development.
Acenaphthylene	80	306.9	acenaphthene	EPA (2003b) PAH mixtures	
Anthracene	13	0.73	Tier II	Tier II	The document calculated for AWQC, but never adopted.
Benzo(a)anthracene	0.49	0.027	Tier II	Tier II	
Benzo(a)pyrene	0.24	0.014	Tier II	Tier II	
Benzo(b)fluoranthene	NA	0.6774	NA	EPA (2003b) PAH mixtures	Per EPA, exclude the acute SL.
Benzo(b+j)fluoranthene	NA	0.6415	NA	benzo(k)fluoranthene	Per EPA, exclude the acute SL
Benzo(b+k)fluoranthene	NA	0.6415	NA	benzo(k)fluoranthene	Per EPA, exclude the acute SL
Benzo(g,h,i)perylene	NA	0.4391	NA	EPA (2003b) PAH mixtures	Per EPA, exclude the acute SL
Benzo(k)fluoranthene	NA	0.6415	NA	EPA (2003b) PAH mixtures	Per EPA, exclude the acute SL
Chrysene	NA	2.042	NA	EPA (2003b) PAH mixtures	Per EPA, exclude the acute SL
Dibenz(a,h)anthracene	0.24	0.2825	benzo(a)pyrene	EPA (2003b) PAH mixtures	
Fluoranthene	33.6	6.16	AWQC	AWQC	Presented in Suter and Tsao (1996) (Tier II), calculated for AWQC though never adopted.

Table 1. Selected acute and chronic ecological screening levels (Eco SLs) for chemicals in water [a]

CONTAMINANT OF INTEREST[b]	SELECTED ACUTE SL (µg/L)	SELECTED CHRONIC SL (µg/L)	ACUTE SOURCE OR SURROGATE[c]	CHRONIC SOURCE OR SURROGATE[c]	CITATIONS AND NOTES[d]
Fluorene	70	3.9	Tier II	Tier II	
Indeno(1,2,3-cd)pyrene	0.24	0.275	benzo(a)pyrene	EPA (2003b) PAH mixtures	
Naphthalene	190	12	Tier II	Tier II	
Phenanthrene	30	6.3	AWQC	AWQC	Presented in Suter and Tsao (1996) (Tier II), calculated for AWQC though never adopted.
Pyrene	NA	10.11	NA	EPA (2003b) PAH mixtures	Per EPA, exclude the acute SL.
PCBs					
Aroclor 1221	5	0.28	Tier II	Tier II	
Aroclor 1242	1.2	0.053	Tier II	Tier II	
Aroclor 1248	1.4	0.081	Tier II	Tier II	
Aroclor 1254	0.6	0.033	Tier II	Tier II	
Aroclor 1260	1,700	94	Tier II	Tier II	
Total PCBs	2	0.014	ODEQ	Tier II	ODEQ value same as value presented in Suter and Tsao (1996) (Tier II), calculated for AWQC though never adopted. Total PCBs criterion applies to total PCBs, as either sum of all homologs, Aroclors, or congeners.
Pesticides					
2,4' D	800	4	LC50/2	MacDonald ES (1999), Ontario Water Quality objective	ECOTOX per EPA
2,4'-DDD	1.1	0.001	4,4'-DDT	4,4'-DDT	EPA (2006) National Recommended Water Quality Criteria
2,4'-DDE	1.1	0.001	4,4'-DDT	4,4'-DDT	EPA (2006) National Recommended Water Quality Criteria
2,4'-DDT	1.1	0.001	4,4'-DDT	4,4'-DDT	EPA (2006) National Recommended Water Quality Criteria
4,4'-DDD	1.1	0.001	4,4'-DDT	4,4'-DDT	EPA (2006) National Recommended Water Quality Criteria
4,4'-DDE	1.1	0.001	4,4'-DDT	4,4'-DDT	EPA (2006) National Recommended Water Quality Criteria
4,4'-DDT	1.1	0.001	AWQC	AWQC	These criteria apply to 4,4'-DDT and its metabolites as stated in Footnote ii of EPA (2006) AWQC.

Table 1. Selected acute and chronic ecological screening levels (Eco SLs) for chemicals in water [a]

CONTAMINANT OF INTEREST[b]	SELECTED ACUTE SL (µg/L)	SELECTED CHRONIC SL (µg/L)	ACUTE SOURCE OR SURROGATE[c]	CHRONIC SOURCE OR SURROGATE[c]	CITATIONS AND NOTES[d]
Aldrin	3	0.3	AWQC	MacDonald ES (1999)	Acute AWQC were developed using previous guidelines (prior to 1985) and were calculated differently than other AWQC.
alpha-Endosulfan	0.22	0.056	AWQC	AWQC	Criteria were derived from data for endosulfan and are most appropriately applied to sum of alpha- and beta-endosulfan but can be applied to either, individually. Acute AWQC were developed using previous guidelines (prior to 1985) and were calculated differently than other AWQC.
alpha-Hexachlorocyclohexane	0.95	0.08	gamma-hexachlorocyclohexane	gamma-hexachlorocyclohexane	
beta-Endosulfan	0.22	0.056	AWQC	AWQC	
beta-Hexachlorocyclohexane	0.95	0.08	gamma-Hexachlorocyclohexane	gamma-Hexachlorocyclohexane	
Carbazole	465	18.6	LC50/2	LC50/50	Brooke (1991) as presented in ECOTOX
Chlordane	1.2	0.0043	AWQC/2	AWQC	Acute AWQC were developed using previous guidelines (prior to 1985) and were calculated differently than other AWQC and are divided by 2 so it is comparable to other AWQC values.
cis-Chlordane	2.4	0.0043	sum chlordane	per EPA	
cis-Nonachlor	1.2	0.0043	sum chlordane	sum chlordane	
Dalapon	NA	2	NA	literature	George et al. (1982)
delta-Hexachlorocyclohexane[e]	0.95	0.08	Lindane	Lindane	Per EPA, use lindane as a surrogate.
Dichloroprop	250	10	LC50/2	LC50/50	EPA (2000)
Dieldrin	0.24	0.056	AWQC	AWQC	
Endosulfan sulfate	0.22	0.056	alpha or beta endosulfan AWQC	alpha or beta endosulfan AWQC	
Endrin	0.086	0.036	AWQC	AWQC	
Endrin aldehyde	0.086	0.036	endrin	endrin	
Endrin ketone	0.086	0.036	endrin	endrin	

Table 1. Selected acute and chronic ecological screening levels (Eco SLs) for chemicals in water [a]

CONTAMINANT OF INTEREST[b]	SELECTED ACUTE SL (µg/L)	SELECTED CHRONIC SL (µg/L)	ACUTE SOURCE OR SURROGATE[c]	CHRONIC SOURCE OR SURROGATE[c]	CITATIONS AND NOTES[d]
gamma-Hexachlorocyclohexane	0.95	0.08	AWQC	ODEQ	
Heptachlor epoxide	0.26	0.0038	AWQC/2	AWQC	Derived from data for heptachlor but may also be applied to heptachlor epoxide. Acute AWQC were developed using previous guidelines (prior to 1985) and were calculated differently than other AWQC and are divided by 2 to make the value comparable to other AWQC values.
Heptachlor	0.26	0.0038	AWQC/2	AWQC	Acute AWQC were developed using previous guidelines (prior to 1985) and were, therefore, calculated differently than other AWQC and are divided by 2 to make the value comparable to other AWQC values.
Methoxychlor	0.3	0.03	AWQC*10	AWQC	
Oxychlordane	1.2	0.0443	Chlordane	Chlordane	Per EPA, chlordane is used as a surrogate.
Retene	176.5	100	LC50/2	literature value	Billiard (1999)
Silvex	125	5.0	LC50/2	LC50/50	ECOTOX per EPA
Total DDT	1.1	0.001	AWQC	AWQC	AWQC for 4,4'-DDT applies to total DDTs. Acute AWQC were developed using previous guidelines (prior to 1985) and were calculated differently than other AWQC.
TPH					
Diesel[f]	NA	NA	NA	EPA	EPA comment 3.1.4. The value is not applied pending further technical justification from EPA as the proposed value (0.014 ug/l) is a narrative water quality number and does not meet the data acceptability criteria of a chronic endpoint based on survival, growth, reproduction.
Gasoline[f]	NA	NA	NA	EPA	EPA comment 3.1.4. The value is not applied pending further technical justification from EPA as the proposed value (114 ug/l) is a narrative water quality number and does not meet the data acceptability criteria of a chronic endpoint based on survival, growth, reproduction.
Phenols					
2,4-Dimethylphenol	2120	42.4	ODEQ	Acute value/50	

Table 1. Selected acute and chronic ecological screening levels (Eco SLs) for chemicals in water [a]

CONTAMINANT OF INTEREST[b]	SELECTED ACUTE SL (µg/L)	SELECTED CHRONIC SL (µg/L)	ACUTE SOURCE OR SURROGATE[c]	CHRONIC SOURCE OR SURROGATE[c]	CITATIONS AND NOTES[d]
2-Chlorophenol	4380	2000	ODEQ	ODEQ	
2-Methylphenol	230	13	Tier II	Tier II	
3- and 4-methylphenol coelution	230	13	2-methylphenol	2-methylphenol	
Pentachlorophenol	10.7	8.2	AWQC	AWQC	The PCP criterion is pH dependent. The listed SLs were calculated for waters at a pH = 7.2 and will vary with the pH of the water column.
Phenol	3600	110	Tier II	Tier II	Presented in Suter and Tsao (1996) (Tier II), calculated for AWQC though never adopted.
Phthlates					
Bis(2-ethylhexyl) phthalate	27	3	Tier II	Tier II	
Butylbenzyl phthalate	150	3	Tier II*50	bis(2-ethylhexyl) phthalate	Per EPA, apply bis(2-ethylhexyl) phthalate value of 3 and a safety factor of 50 to calculate the acute value.
Dibutyl phthalate	150	3	Tier II*50	bis(2-ethylhexyl) phthalate	Per EPA, apply bis(2-ethylhexyl) phthalate value of 3 and a safety factor of 50 to calculate the acute value.
Diethyl phthalate	150	3	Tier II*50	bis(2-ethylhexyl) phthalate	Per EPA, apply bis(2-ethylhexyl) phthalate value of 3 and a safety factor of 50 to calculate the acute value.
Dimethyl phthalate	150	3	Tier II*50	bis(2-ethylhexyl) phthalate	Per EPA, apply bis(2-ethylhexyl) phthalate value of 3 and a safety factor of 50 to calculate the acute value.
Di-n-octyl phthalate	150	3	Tier II*50	bis(2-ethylhexyl) phthalate	Per EPA, apply bis(2-ethylhexyl) phthalate value of 3 and a safety factor of 50 to calculate the acute value.
SVOCs					
Benzoic acid	740	42	Tier II	Tier II	
Hexachlorobenzene	6.0	3.68	EPA	MacDonald ES (1999)	EPA draft criterion
Hexachlorobutadiene	90	9.3	ODEQ	ODEQ	
VOCs					
1,1,1-Trichloroethane	200	11	Tier II	Tier II	

Table 1. Selected acute and chronic ecological screening levels (Eco SLs) for chemicals in water [a]

CONTAMINANT OF INTEREST[b]	SELECTED ACUTE SL (µg/L)	SELECTED CHRONIC SL (µg/L)	ACUTE SOURCE OR SURROGATE[c]	CHRONIC SOURCE OR SURROGATE[c]	CITATIONS AND NOTES[d]
1,1,2,2-Tetrachloroethane	2,100	610	Tier II	Tier II	EPA direction to use the Tier II acute value, instead of the ODEQ acute value.
1,1,2-Trichloroethane	18,000	9,400	ODEQ	ODEQ	
1,1-Dichloroethane	830	47	Tier II	Tier II	1,2-dichloroethene screening values apply to both cis- and trans-congeners.
1,1-Dichloroethene (1,1-Dichloroethylene)	450	25	Tier II	Tier II	
1,2,3-Trichloropropane	2,050	82	LC50/2	LC50/50	Kielhorn et al. (2003)
1,2,4-Trimethylbenzene	130	7.3	ethylbenzene	ethylbenzene	
1,2-Dichlorobenzene	260	14	Tier II	Tier II	
1,2-Dichloroethane	8,800	910	Tier II	Tier II	
1,2-Dichloroethene (trans)	1,100	590	Tier II	Tier II	
1,2-Dichloropropane	23,000	5,700	ODEQ	ODEQ	
1,3,5-Trimethylbenzene	130	7.3	ethylbenzene	ethylbenzene	
1,3-Dichlorobenzene	630	71	Tier II	Tier II	
1,4-Dichlorobenzene	180	15	Tier II	Tier II	
1,4-Dioxane	900,000	36,000	LC50/2	LC50/50	Brooke (1987), screening values are based on a measured LC50 for the amphipod *Gammarus pseudolimnaeus*.
2-Hexanone (me-butyl ketone)	1,800	99	Tier II	Tier II	
4-chloro-3-methylphenol	30	0.60	ODEQ	ODEQ/50	
Acetone	28,000	1,500	Tier II	Tier II	
Acrolein	68	21	ODEQ	ODEQ	
Ammonia	19,727	5,389	AWQC	AWQC	Ammonia was not analyzed in surface water or transition zone water.
Benzene	2,300	130	Tier II	Tier II	

Table 1. Selected acute and chronic ecological screening levels (Eco SLs) for chemicals in water [a]

CONTAMINANT OF INTEREST[b]	SELECTED ACUTE SL (µg/L)	SELECTED CHRONIC SL (µg/L)	ACUTE SOURCE OR SURROGATE[c]	CHRONIC SOURCE OR SURROGATE[c]	CITATIONS AND NOTES[d]
Bis(2-ethylhexyl)adipate	240	24	LC50/2	Felder et al. (1986); *Daphnia* chronic value	MATC value; used lower end of range 24-52 ug/L
Bromochloromethane	11,000	220	ODEQ	ODEQ/50	ODEQ criteria for halomethanes.
Bromodichloromethane	11,000	220	ODEQ	ODEQ/50	ODEQ criteria for halomethanes.
Bromomethane	11,000	220	ODEQ	ODEQ/50	ODEQ criteria for halomethanes.
Carbon disulfide	17	0.92	Tier II	Tier II	
Chlorobenzene	250	50	ODEQ	ODEQ	The screening values are for chlorobenzenes, not chlorobenzene (i.e. monochlorobenzene) specifically.
Chloroethane	830	47	1,1-dichloroethane, Tier II	1,1-dichloroethane, Tier II	
Chloroform	28,900	1,240	ODEQ	ODEQ	
Chloromethane	11,000	220	ODEQ	ODEQ/50	The acute value is based on ODEQ acute criterion for halomethanes.
cis-1,2-Dichloroethene (cis-1,2-Dichloroethylene)	11,600	590	ODEQ	Tier II	
Dichlorodifluoromethane	11,000	90	ODEQ	Canadian EQG	ODEQ criteria for halomethanes.
Ethylbenzene	3200	7.3	ODEQ	Tier II	
Hexachloroethane	210	12	Tier II	Tier II	
Isophorone	117,000	130	ODEQ	MacDonald ES (1999)	
Isopropylbenzene (1-Methylethylbenzene)	130	7.3	ethylbenzene	ethylbenzene	
m,p-Xylene (m-xylene)	1,200	66.67	EPA	EPA	EPA (2006a)
m,p-Xylene (p-xylene)	230	13	xylene	Xylene	
Methyl isobutyl ketone	2,200	170	Tier II	Tier II	A commonly used synonym for MIBK is 4-methyl-2-pentanone.
Methylene bromide	11,000	11	ODEQ	MacDonald ES (1999)	The acute value is based on ODEQ acute criterion for halomethanes.
Methylene chloride	11,000	2,200	ODEQ	Tier II	The acute value is based on ODEQ acute criterion for halomethanes.

Table 1. Selected acute and chronic ecological screening levels (Eco SLs) for chemicals in water [a]

CONTAMINANT OF INTEREST[b]	SELECTED ACUTE SL (µg/L)	SELECTED CHRONIC SL (µg/L)	ACUTE SOURCE OR SURROGATE[c]	CHRONIC SOURCE OR SURROGATE[c]	CITATIONS AND NOTES[d]
Methylethyl ketone	240,000	14,000	Tier II	Tier II	
MTBE	151,000	10,000	Mancini et al. (2002)	Canadian EQG	
n-Butylbenzene	130	7.3	ethylbenzene	ethylbenzene	
n-Propylbenzene	130	7.3	ethylbenzene	ethylbenzene	
o-Xylene	230	13	xylene	Xylene	
Perchlorate	NA	18	NA	Goleman et al. (2002)	
p-Isopropyltoluene (p-cymene)	17,500	9.8	toluene	toluene	
Sec-butylbenzene	130	7.3	ethylbenzene	ethylbenzene	
Styrene	NA	4	NA	MacDonald ES (1999)	
tert-Butylbenzene	130	7.3	ethylbenzene	ethylbenzene	
Tetrachloroethene	5,280	840	ODEQ	ODEQ	
Toluene	17,500	9.8	ODEQ	Tier II	
trans-1,2-Dichloroethene	11,600	590	ODEQ	Tier II	
Trichloroethene	45,000	21,900	ODEQ	ODEQ	
Trichlorofluoromethane	11,000	580	ODEQ	MacDonald ES (1999)	Acute from ODEQ criteria for halomethanes.
Vinyl acetate	280	16	Tier II	Tier II	
Vinyl chloride	97,000	3,880	NR LETH/4	LC50/50	Brown et al. (1977); NR LETH/4 notation represents the 10-day LC_{100} for northern pike divided by four.
Vinylidene chloride	11,600	25	ODEQ	Tier II	
Xylene	230	13	Tier II	Tier II	

[a] The process for developing these screening levels is presented in a technical memo (Windward 2005). As recommended by EPA, these screening levels are intended to be part of a tool that is "easy to use, fast, and conservative" (EPA 2005). As such, these are conservative screening values and will be taken into context through the risk process (evaluation of derivation of SL, background, etc). Water SLs will be used to evaluate surface water and transition zone water. Other water data (e.g. seep water) may be evaluated using water SLs as agreed upon between LWG, EPA, and EPA's partners.

[b] Contaminants of interest included detected chemicals from water samples from Round 2 data collection (including surface water and transition zone water) except nutrients, petroleum products (heavy oil and motor oil), and PCB congeners (dioxin-like congeners will be included in dioxin value).

[c] Ambient Water Quality Criteria (AWQC) are from EPA (2002) and EPA(2006b). Tier II and lowest chronic values (LCV) are from Suter and Tsao (1996). Oregon Department of Environmental Quality (ODEQ) values are from ODEQ (2001). PAH mixture values are from EPA (2003b). Canadian EQG are from Canadian Water Quality Guidelines updated 2005. MacDonald ES (1999) are from Environment Canada, Georgia Basin Action Plan compendium of environmental quality benchmarks.

[d] References cited from ECOTOX and primary literature.

[e] An acute screening value for delta-hexachlorocyclohexane exists from MacDonald ES (1999), the proposed EPA value was applied, but requires more technical explanation for using a lindane surrogate number.

[f] The proposed EPA chronic value for gasoline and diesel range hydrocarbons (0.014 ug/L) is not applied pending further technical justification from EPA. The proposed EPA number is a narrative water quality criteria and does not meet data acceptability standards of a chronic toxicity endpoint of growth, reproduction, or mortality.

REFERENCES

Billiard SM, Querbach K, Hodson PV. 1999. Toxicity of retene to early life stages of two freshwater fish species. Environ Toxicol Chem 18(9):2070-2077.

Brooke L. 1987. Report of the flow-through and static acute text comparisons with fathead minnows and acute tests with an amphipod and a cladoceran. Center for Lake Superior Environmental Studies, University of Wisconsin-Superior, Superior, WI.

Brooke LT. 1991. Results of freshwater exposures with the chemicals atrazine, biphenyl, butachlor, carbaryl, carbazole, dibenzofuran, 3,3'-dichlorobenzidine, dichlorvos 1,2-epoxyethylbenzene (styrene oxide), isophorone, isopropalin, oxyc. Center for Lake Superior Environmental Studies, University of Wisconsin-Superior, Superior, WI.

Brown ER, Sinclair T, Keith L, Beamer P, Hazdra JJ, Nair V, Callaghan O. 1977. Chemical pollutants in relation to diseases in fish. Ann NY Acad Sci 298:535-546.

EPA. 1984. Ambient water quality criteria for 2,3,7,8-tetrachlorodibenzo-p-dioxin. EPA 440/5-84-007. US Environmental Protection Agency, Washington, DC.

EPA. 2000. Pesticide Ecotoxicity Database (formerly Environmental Effects Database, EEDB) [online]. Office of Pesticide Programs, US Environmental Protection Agency, Washington, D C. Available from.

EPA. 2002. National recommended water quality criteria: 2002. EPA-822-R-02-047. US Environmental Protection Agency, Washington, DC.

EPA. 2003a. Ambient aquatic life water quality criteria for tributyltin (TBT) - final. EPA 822-R-03-031. US Environmental Protection Agency, Washington, DC.

EPA. 2003b. Procedures for the derivation of equilibrium partitioning sediment benchmarks (ESBs) for the protection of benthic organisms: PAH mixtures. EPA-600-R-02-013. Office of Research and Development, US Environmental Protection Agency, Washington, DC.

EPA. 2005. Exposure assessment tools and models: screening level tools [online]. Office of Pollution Prevention and Toxics, US Environmental Protection Agency, Washington, DC. Updated 5/24/04. [Cited 8/25/05]. Available from: http://www.epa.gov/opptintr/exposure/docs/screen.htm.

EPA. 2006a. Memorandum from D. Mount to ERAF tri-chairs (B. Pluta, M. Sprenger, V. Madden) dated September 13, 2006: Error in prior calculation of GLI Tier II SCV for m-xylene. National Health and Environmental Effects Research Laboratory, US Environmental Protection Agency, Duluth, MN.

EPA. 2006b. National recommended water quality criteria (4304T). US Environmental Protection Agency, Washington, DC.

Felder JD, Adams WH, Saeger VW. 1986. Assessment of the safety of dioctyl adipate in freshwater environments. Environ Toxicol Chem 5(8):777-784.

George JP, Hingorani HG, Rao KS. 1982. Herbicide toxicity to fish-food organisms. Environ Pollut Series A Ecol Biol 28(3):183-188.

Goleman WL, Urquidi LJ, Anderson TA, Smith EE, Kendall RJ, Carr JA. 2002. Environmentally relevant concentrations of ammonium perchlorate inhibit development and metamorphosis in *Xenopus laevis*. Environ Toxicol Chem 21(2):424-430.

Kielhorn J, Koennecker G, Pohlenz-Michel C, Schmidt S, Mangelsdorf I. 2003. Concise international chemical assessment (CICAD) document 56: 1,2,3-trichloropropane [online]. World Health Organization, Geneva. Available from: http://www.inchem.org/documents/cicads/cicads/cicad56.htm.

MacDonald ES. 1999. Appendix 2-4: A summary of the available water quality criteria and guidelines for the protection of freshwater aquatic life. In: The Georgia Basin action plan: A compendium of environmental quality benchmarks. Prepared for Environment Canada. MacDonald Environmental Services Ltd, Ladysmith, BC.

Mancini ER, Steen A, Rausina GA, Wong DCL, Arnold WR, Gostomski FE, Davies TT, Hockett JR, Stubblefield WA, Drottar KR, Springer TA, Errico P. 2002. MTBE ambient water quality criteria development: a public/private partnership. Environ Sci Tech 36:125-129.

ODEQ. 2001. Water pollution, Division 41, State-wide water quality management plan; beneficial uses, policies, standards, and treatment criteria for Oregon. 340-041-0001. [online]. Oregon Department of Environmental Quality, Portland, OR. Available from: http://www.deq.state.or.us/wq/wqrules/340Div41.pdf.

Suter GW, Tsao CL. 1996. Toxicological benchmarks for screening potential contaminants of concern for effects on aquatic biota: 1996 revision. Prepared for U.S. Department of Energy Office of Environmental Management. Risk Assessment Program, Health Sciences Research Division.

Windward. 2005. Portland Harbor RI/FS. Ecological risk assessment: Process for selecting acute and chronic water screening levels for Portland Harbor surface water, groundwater, and transition zone water. WE-05-0004. Draft. Prepared for Lower Willamette Group. Windward Environmental LLC, Seattle, WA.